# PTH12010

## 12 Vin single output

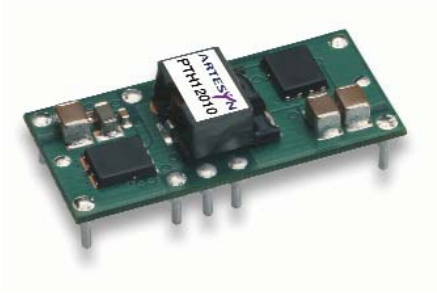
POLA Point-of-Load Alliance

ARTESYN TECHNOLOGIES



**NEW Product**

- **12 A output current**
- **12 V input voltage**
- **Wide-output voltage adjust**
  - **1.2 Vdc to 5.5 Vdc for suffix 'W' and 0.8 Vdc to 1.8 Vdc for suffix 'L'**
- **Auto-track™ sequencing***
- **Margin up/down controls**
- **Efficiencies up to 94%**
- **Output ON/OFF inhibit**
- **Output voltage sense**
- **Point-of-Load-Alliance (POLA) compatible**
- **Available RoHS compliant**




The PTH12010 is a next generation series of non-isolated dc-dc converters offering some of the most advanced POL features available in the industry. The primary new feature provides for sequencing between multiple modules, a function, which is becoming a necessity for powering advanced silicon including DSP's, FPGA's and ASIC's requiring controlled power-up and power-down. Other industry leading features include margin up/down controls and efficiencies up to 94%. The PTH12010 has an input voltage of 10.8 Vdc to 13.2 Vdc and offers a wide 1.2 Vdc to 5.5 Vdc output voltage range with up to 12 A output current, which allows for maximum design flexibility and a pathway for future upgrades.

**2 YEAR WARRANTY**

***All specifications are typical at nominal input, full load at 25 °C unless otherwise stated***
***$C_{in}$ = 560 µF, $C_{out}$ = 0 µF***

## SPECIFICATIONS

### OUTPUT SPECIFICATIONS

| | | |
|---|---|---|
| Voltage adjustability (See Note 4) | Suffix '-W'<br>Suffix '-L' | 1.2-5.5 Vdc<br>0.8-1.8 Vdc |
| Setpoint accuracy | | ±2.0% Vo |
| Line regulation | | ±10 mV typ. |
| Load regulation | | ±12 mV typ. |
| Total regulation | | ±3.0% Vo |
| Minimum load | | 0 A |
| Ripple and noise 20 MHz bandwidth | Suffix '-W'<br>Suffix '-L' | 25 mV pk-pk<br>25 mV pk-pk |
| Temperature co-efficient | -40 °C to +85 °C | ±0.5% Vo |
| Transient response (See Note 5) | | 70 µs recovery time<br>Overshoot/undershoot 100 mV |
| Margin adjustment | | ±5.0% Vo |

### INPUT SPECIFICATIONS

| | | |
|---|---|---|
| Input voltage range | (See Note 3) | 10.8-13.2 Vdc |
| Input current | No load | 10 mA typ. |
| Remote ON/OFF | (See Note 1) | Positive logic |
| Start-up time | | 1 V/ms |
| Undervoltage lockout | | 9.0-9.5 V typ. |
| Track input voltage | Pin 8 (See Note 6) | ±0.3 Vin |

### EMC CHARACTERISTICS

| | |
|---|---|
| Electrostatic discharge | EN61000-4-2, IEC801-2 |
| Conducted immunity | EN61000-4-6 |
| Radiated immunity | EN61000-4-3 |

### GENERAL SPECIFICATIONS

| | | |
|---|---|---|
| Efficiency | | See Tables on page 2 |
| Insulation voltage | | Non-isolated |
| Switching frequency | Suffix '-W'<br>Suffix '-L' | 300 kHz to 400 kHz<br>200 kHz to 300 kHz |
| Approvals and standards | | EN60950<br>UL/cUL60950 |
| Material flammability | | UL94V-0 |
| Dimensions | (L x W x H) | 34.80 x 15.75 x 9.00 mm<br>1.370 x 0.620 x 0.354 in |
| Weight | | 5 g (0.18 oz) |
| MTBF | Telcordia SR-332 | 7,092,000 hours |

### ENVIRONMENTAL SPECIFICATIONS

| | | |
|---|---|---|
| Thermal performance (See Note 2) | Operating ambient, temperature<br>Non-operating | -40 °C to +85 °C<br>-40 °C to +125 °C |
| MSL ('Z' suffix only) | JEDEC J-STD-020C | Level 3 |

### PROTECTION

| | | |
|---|---|---|
| Short-circuit | Auto reset | 20 A typ. |

**International Safety Standard Approvals**

UL/cUL CAN/CSA-C22.2 No. 60950-1-03/UL 60950-1, File No. E174104

TÜV Product Service (EN60950) Certificate No. B 04 06 38572 044
CB Report and Certificate to IEC60950, Certificate No. US/8292/UL

*Auto-track™ is a trade mark of Texas Instruments

| OUTPUT POWER (MAX.) | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT (MIN.) | OUTPUT CURRENT (MAX.) | EFFICIENCY (MAX.) | REGULATION | | MODEL NUMBER [8,9] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | LINE | LOAD | |
| 66 W | 10.8-13.2 Vdc | 0.8-1.8 Vdc | 0 A | 12 A | 89% | ±10 mV | ±12 mV | PTH12010L |
| 66 W | 10.8-13.2 Vdc | 1.2-5.5 Vdc | 0 A | 12 A | 94% | ±10 mV | ±12 mV | PTH12010W |

### Part Number System with Options

**P T H 1 2 0 1 0 W A S T**

**Product Family**
Point of Load Alliance Compatible

**Input Voltage**
12 = 12 V

**Output Current**
01 = 12 A

**Mechanical Package**
Always 0

**Packaging Options**
No Suffix = Trays
T = Tape and Reel [7]

**Mounting Option** [8]
D = Horizontal Through-Hole (Matte Sn)
H = Horizontal Through-Hole (Sn/Pb)
S = Surface-Mount (63/37 Sn/Pb pin solder material)
Z = Surface-Mount (96.5/3.0/0.5 Sn/Ag/Cu pin solder material)

**Pin Option**
A = Through-Hole Std. Pin Length (0.140")
A = Surface-Mount Tin/Lead Solder Ball

**Output Voltage Code**
W = Wide, L = Low Voltage

### Output Voltage Adjustment of the PTH12010 Series

The ultra-wide output voltage trim range offers major advantages to users who select the PTH12010. It is no longer necessary to purchase a variety of modules in order to cover different output voltages. The output voltage can be trimmed in a range of 1.2 V to 5.5 V for suffix 'W' and 0.8 Vdc to 1.8 Vdc for suffix 'L'. When the PTH12010 converter leaves the factory the output has been adjusted to the default voltage of 1.2 V for the PTH12010W and 0.8 V for PTH12010L.

| EFFICIENCY TABLE - PTH12010W ($I_O$ = 8 A) | |
|---|---|
| OUTPUT VOLTAGE | EFFICIENCY |
| Vo = 5.0 V | 94% |
| Vo = 3.3 V | 93% |
| Vo = 2.5 V | 91% |
| Vo = 2.0 V | 90% |
| Vo = 1.8 V | 89% |
| Vo = 1.5 V | 88% |
| Vo = 1.2 V | 86% |

| EFFICIENCY TABLE - PTH12010L ($I_O$ = 8 A) | |
|---|---|
| OUTPUT VOLTAGE | EFFICIENCY |
| Vo = 1.8 V | 89% |
| Vo = 1.5 V | 88% |
| Vo = 1.2 V | 86% |
| Vo = 1.0 V | 84% |
| Vo = 0.8 V | 82% |

### Notes

1. Remote ON/OFF. Positive Logic
   ON: Pin 3 open; or V > Vin - 0.5 V
   OFF: Pin 3 GND; or V < 0.8 V (min - 0.2 V).
2. See Figures 1, 2 and 3 for safe operating curves for the PTH12010W and Figures 6 and 7 for PTH12010L.
3. A 560 µF electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 800 mA rms of ripple current.
4. An external output capacitor is not required for basic operation. Adding 330 µF of distributed capacitance at the load will improve the transient response.
5. 1 A/µs load step, 50 to 100% $I_{omax}$, $C_{out}$ = 330 µF.
6. If utilized Vout will track applied voltage by ±0.3 V (up to Vo set point).
7. Tape and reel packaging only available on the surface-mount versions.
8. To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH12010WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH12010WAD.
9. NOTICE: Some models do not support all options. Please contact your local Artesyn representative or use the on-line model number search tool at http://www.artesyn.com/powergroup/products.htm to find a suitable alternative.

**PTH12010W Characteristic Data**

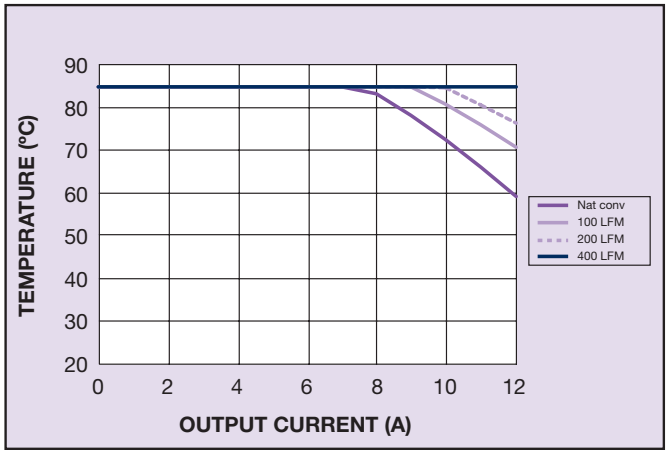



**Figure 1 - Safe Operating Area**
**Vin = 12 V, Output Voltage = 5 V (See Note A)**

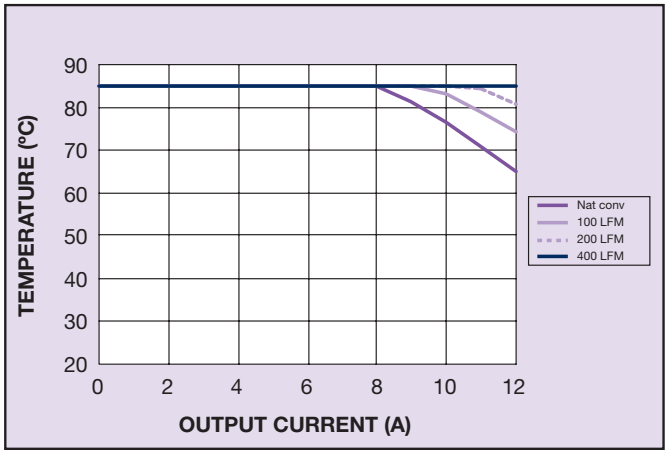



**Figure 2 - Safe Operating Area**
**Vin = 12 V, Output Voltage = 3.3 V (See Note A)**

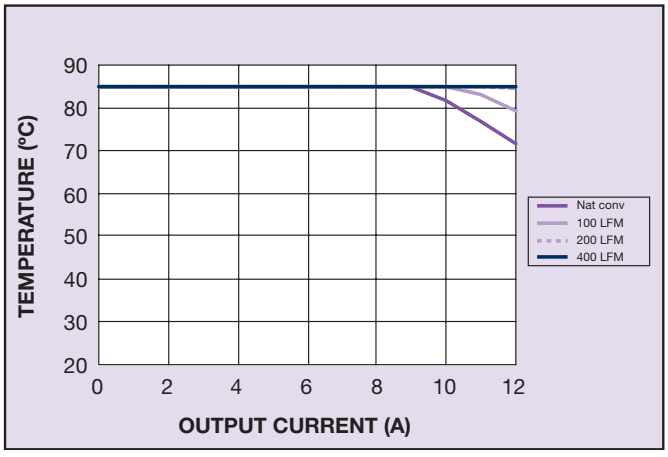



**Figure 3 - Safe Operating Area**
**Vin = 12 V, Output Voltage ≤ 1.8 V (See Note A)**

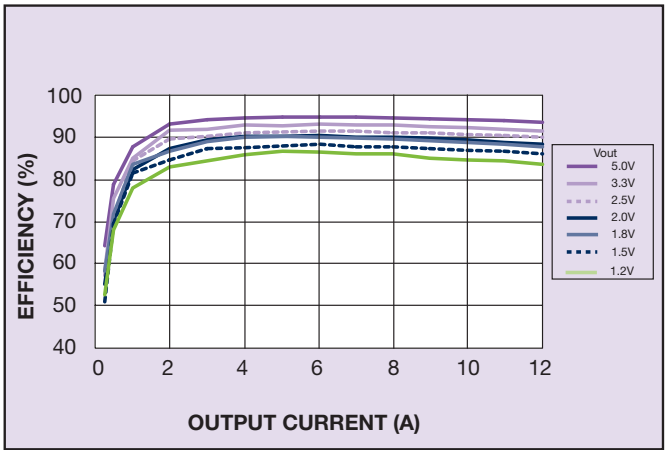



**Figure 4 - Efficiency vs Load Current**
**Vin = 12 V (See Note B)**

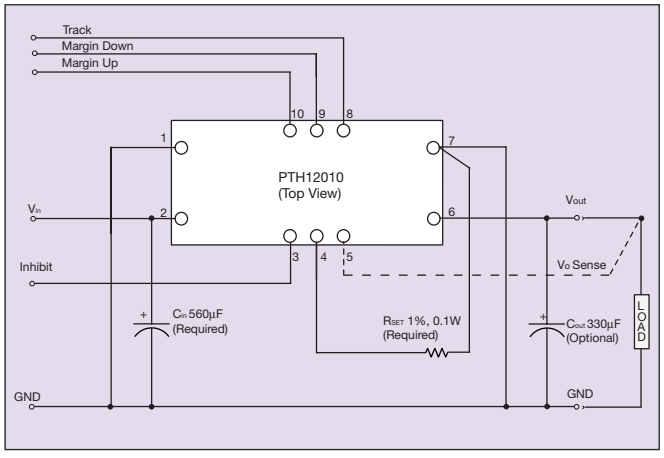



**Figure 5 - Standard Application**

## Notes

**A** SOA curves represent the conditions at which internal components are within the Artesyn derating guidelines.

**B** Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

**PTH12010L Characteristic Data**

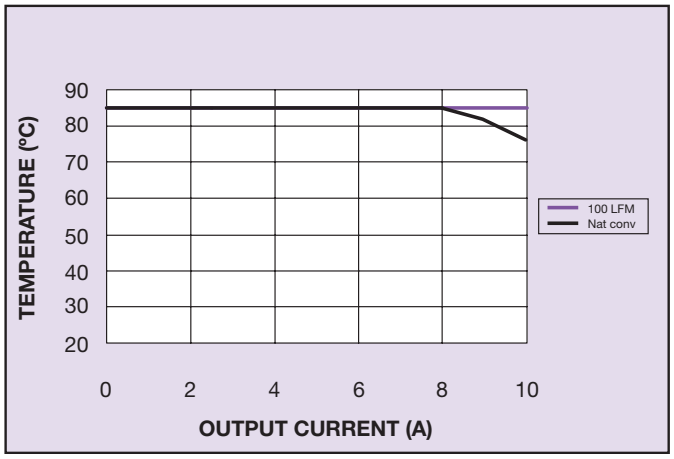



**Figure 6 - Safe Operating Area**
**Vin = 12 V, Output Voltage ≤ 1.8 V (See Note A)**

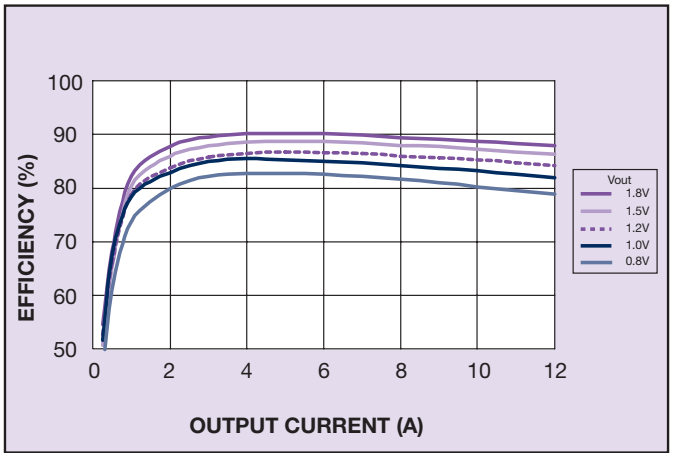



**Figure 7 - Efficiency vs Load Current**
**Vin = 12 V (See Note B)**

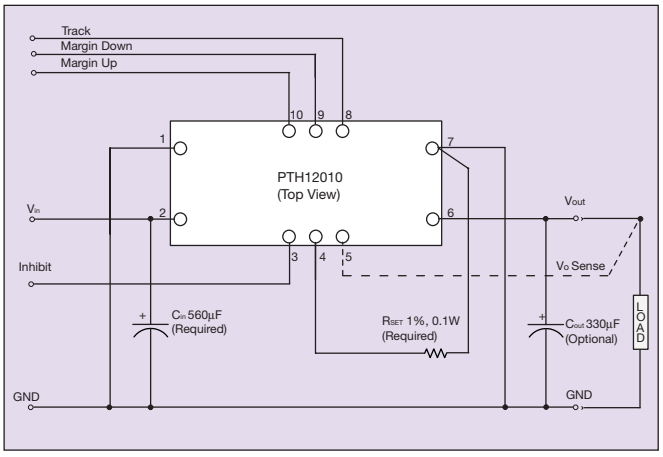



**Figure 8 - Standard Application**

## Notes

**A** SOA curves represent the conditions at which internal components are within the Artesyn derating guidelines.

**B** Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

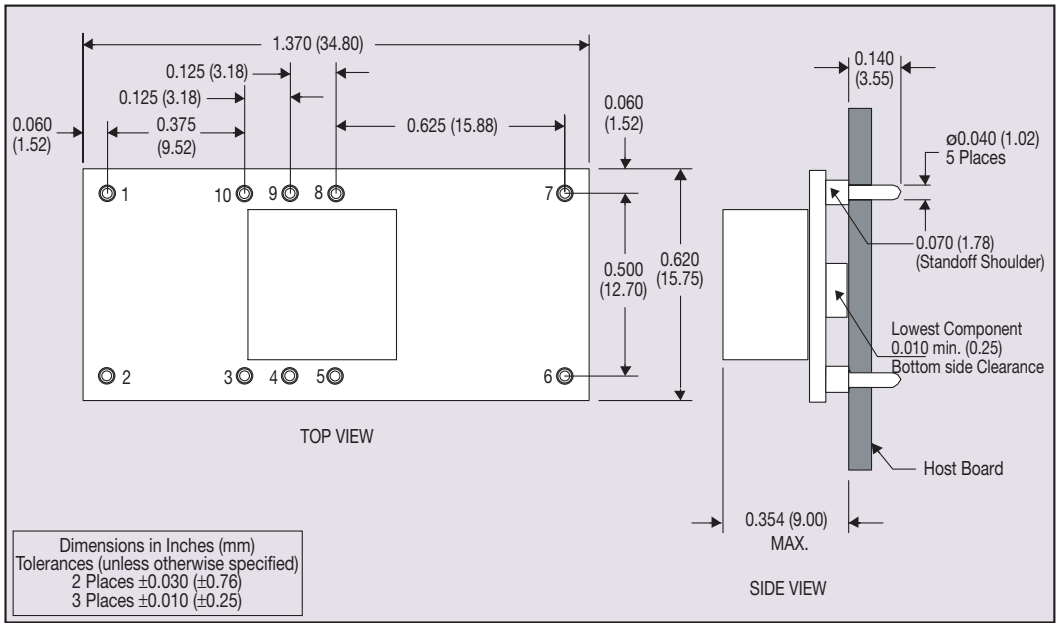



**Figure 9 - Plated Through-Hole Mechanical Drawing**

| PIN CONNECTIONS | |
|---|---|
| PIN NO. | FUNCTION |
| 1 | Ground |
| 2 | Vin |
| 3 | Inhibit* |
| 4 | Vo adjust |
| 5 | Vo sense |
| 6 | Vout |
| 7 | Ground |
| 8 | Track |
| 9 | Margin down* |
| 10 | Margin up* |

*Denotes negative logic:
Open = Normal operation
Ground = Function active

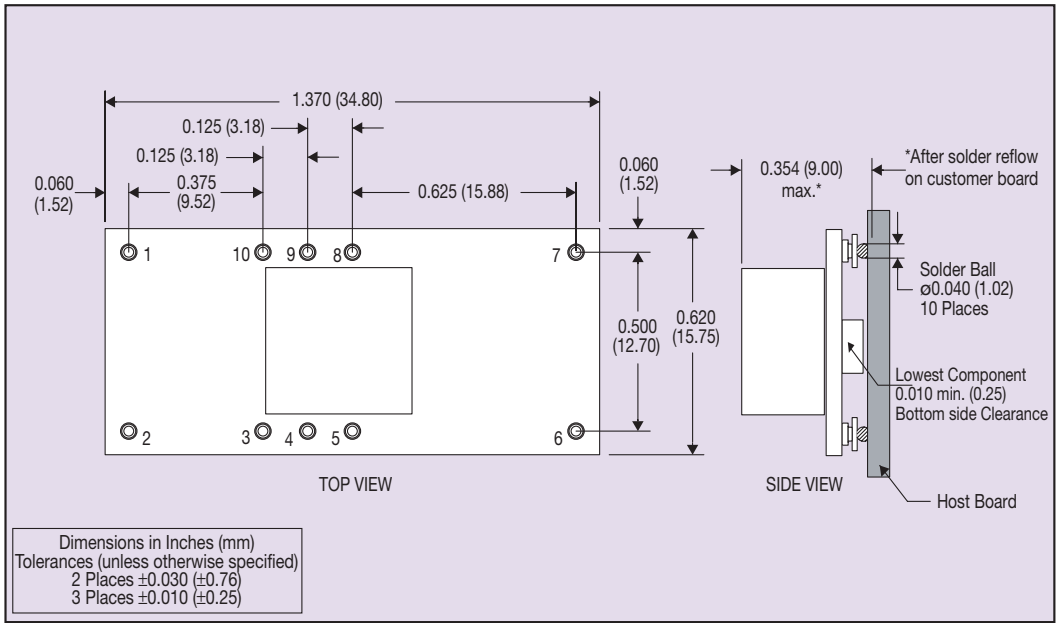



**Figure 10 - Surface-Mount Mechanical Drawing**